

VERIFIGLOBAL NEWSLETTER



*Comprehensive performance verification
with global market reach
Accurate - Reliable - Credible*

Creating Value Through Resilient Sustainable Solutions

Threats to global security, resiliency and sustainability derive from population growth, increasing demand for resources, jurisdictional disputes, and the effects of climate change.

Environmental resilience and sustainability are based on ecosystem carrying capacity, climate change adaptation, and the integration of water and energy efficiency across production and consumption activities in all sectors.

Solution providers and proponents are expected to deliver results that reduce or eliminate negative ecological impacts, provide superior performance, and use fewer resources relative to conventional practices.

Environmental sustainability is a continuum, which relies upon decisions and subsequent actions based on measurement, analysis, and feedback.

Market acceptance and adoption of innovative solutions are most likely to succeed through iterative approaches that demonstrate benefits in the context of environmental change and the requirements for long-term adaptive management.

The International Organization for Standardization (ISO) Environmental Technology Verification (ETV) Standard, ISO 14034, is an internationally accepted process upon which credible performance monitoring, testing and verification of innovative technologies and infrastructure solutions can be based.

ISO 14034 helps solution adopters, investors and regulators make informed choices, and benefits technology companies seeking market acceptance of their innovative solutions. ISO 14034 adds value by assisting decision-makers in determining which technology and infrastructure options are viable and sustainable over the long-term, thereby making it easier to demonstrate, integrate and optimize innovative, decentralized solutions with existing technology systems and infrastructure. Performance measurement, verification, and reporting also strengthens the business case for users, operators, and regulators, encouraging investment and greater market acceptance of innovative, sustainable solutions.

MARCH 2022

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Resilience, Adaptation, Sustainability

The **ISO 14034** standard is intended to strengthen global capacity to undertake performance benchmarking, testing and verification, ensuring that performance reporting on technologies and infrastructure solutions is clear, complete, objective, and useful. It combines a robust, quality-assured evidence-based process with a market-driven, collaborative approach.

Selection and implementation of innovative solutions requires reliable information on the performance of operating systems, processes, networks,

and the technologies, sensors and other sub-components that enable them.

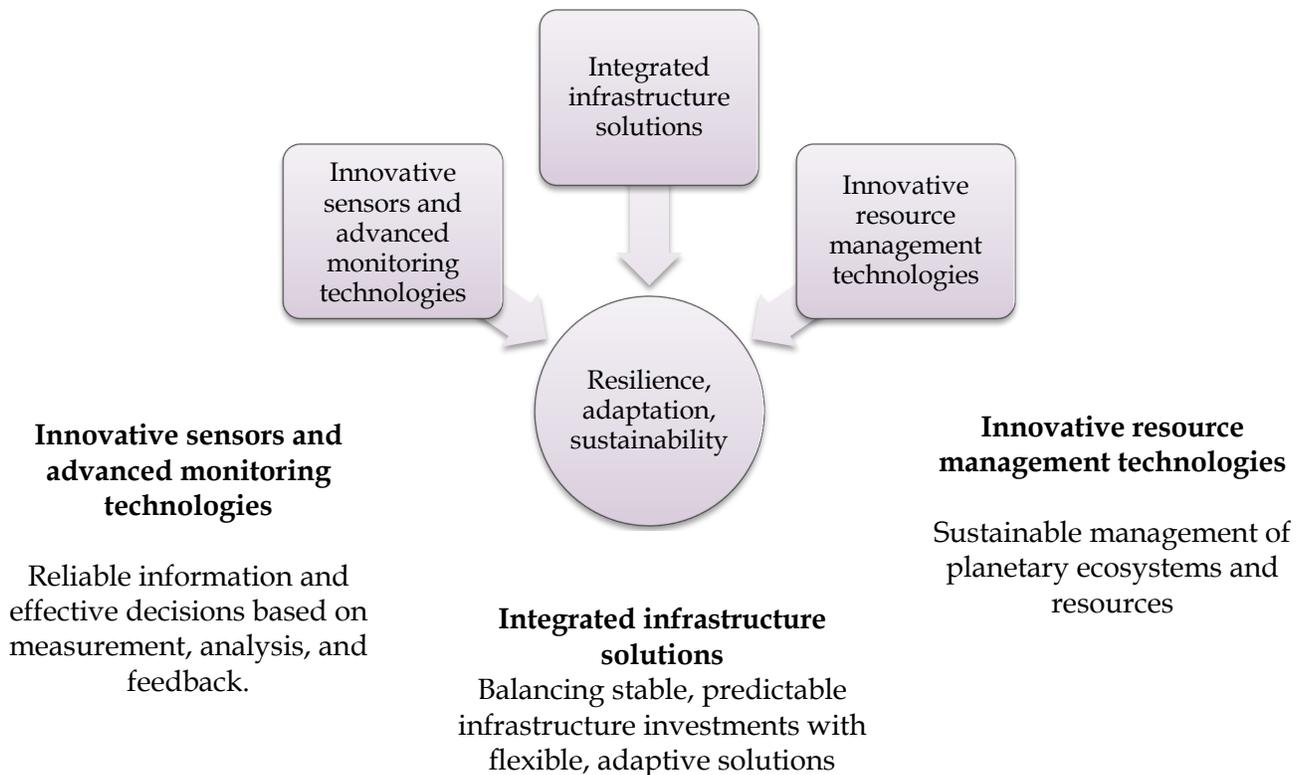
It is difficult for any one solution provider, specifier, or regulator to understand and adequately evaluate all options. Advancing innovative technologies and infrastructure therefore requires comprehensive, evidence-based performance benchmarking and verification. Coupled to this is the application of new “smart” tools and systems to gather meaningful and actionable data.

The combination of affordable, high-quality sensors and new

technologies translates to safer and more reliable operations for a diverse range of facilities and infrastructure, both centralized and decentralized, equating to more effective risk management and better-informed decisions.

As illustrated below, VerifiGlobal has identified three important innovation opportunities for advancing resilience, adaptation and sustainability that can benefit from evidence-based performance benchmarking and verification.

Comprehensive, evidence-based performance benchmarking and verification for advancing innovative technologies and infrastructure



Collaborate with VerifiGlobal in addressing resilience, adaptation and sustainability





U.S. EPA Advanced Septic System Nitrogen Sensor Challenge Outcomes and Lessons Learned

Context

Excess nutrients in the environment are a threat to drinking water and coastal resources. Conventional onsite septic systems are a source of increasing nitrogen loadings. In the U.S. alone there are at least 2.6 million conventional onsite systems in vulnerable coastal areas.



Although nitrogen-reducing innovative/alternative (I/A) onsite technologies are available, they are not yet in widespread use due to caution about long-term performance, lengthy I/A approval processes, and ongoing operation and maintenance requirements. In-person performance sampling can be costly.

Solution

Advancing widespread use of ‘smart’ innovative/alternative onsite wastewater treatment systems as an integral part of water management infrastructure.

The U.S. EPA Advanced Septic System Nitrogen Sensor Challenge successfully demonstrated the performance of an accurate, low-cost nitrogen sensor to measure nitrate/nitrite and ammonium in septic system effluent. The sensor operates autonomously and requires no more than quarterly servicing. (See article on page 6).

It is anticipated that this technology will help facilitate the expanded use of I/A onsite systems, upgrades, and retrofits in coastal areas by providing essential performance information to technology developers, users, and regulators.

Performance testing and verification of the nitrogen sensor involved a multi-phased process, which included stakeholder engagement, the use of technical experts, and the development of a Test and Quality Assurance Plan (T/QAP). The testing methodology was validated through repeated prototype testing and statistical evaluation. The validated T/QAP is available to septic sensor developers as reference for future testing.



Field Trailer at MASSTC



Test Tank Field Measurements



Sensor sampling tube in Test Cell



Sensors in Test Cell



Collecting Samples



BCDHE Laboratory

U.S. EPA Advanced Septic System Nitrogen Sensor Challenge Outcomes and Lessons Learned



ETV provides credible, impartial account of technology performance which contributes to environmental objectives



ETV is effective in verifying performance of technologies with innovative features and environmental benefits not fully reflected in existing product standards



ETV bridges gap between demonstrating performance of innovative technologies and acceptance by regulators and technology users

Verification of the performance test results was performed in accordance with the International Organization for Standardization (ISO) Environmental Technology Verification (ETV) standard, ISO 14034, which specifies a 3rd party, quality-assured process for confirming environmental technology performance, based on objective evidence. The ETV process was initially developed by US EPA more than 20 years ago.

The ETV process provides a credible, impartial account of the performance of technologies, which contribute to the attainment of environmental objectives, for example, with specific, quantifiable environmental benefits (i.e., technologies with more beneficial or less adverse environmental impacts); or superior measurement of environmental impacts (i.e., environmental monitoring and surveillance technologies). The process is particularly effective for verifying the performance of technologies with innovative features and environmental benefits not fully reflected in existing product standards.

Three key principles - Flexibility, Credibility and Transparency - ensure verifications are performed and reported accurately. ETV also helps bridge the gap between demonstrating performance of innovative technologies, and their acceptance by regulators and technology users.

ISO 14034 ETV is a 5-step process:

- 1. Application stage** - Sufficient information on the technology with specific performance parameters, constituting a verifiable technology performance claim.
- 2. Pre-verification** - Verifiability of the technology performance claim, preparation of verification plan and specification of test procedures for generating independent quality-assured data to support the performance claim.
- 3. Verification stage** - Confirmation of the technology performance claim based on independent quality-assured test data.
- 4. Reporting stage** - Preparation of a verification report by independent verifier, providing the essential information to be included in the verification statement.
- 5. Post-verification** - Verification statement issued and posted.

ISO 14034 ETV roles and responsibilities for the EPA Nitrogen Sensor Challenge:



Test Bodies: Massachusetts Alternative Septic System Testing Center (MASSTC) and Barnstable County Department of Health and Environment Laboratory - *Performance testing as specified in the T/QAP, meeting the testing and calibration conformity requirements of ISO 17025.*



Technical Verifier: Battelle – *ISO 14034 verification of the performance test results, meeting the inspection/ verification conformity requirements of ISO 17020.*



Verification Body: VerifiGlobal - *Preparation of the ISO 14034 Verification Plan and issuing the Verification Statement.*



U.S. EPA Advanced Septic System Nitrogen Sensor Challenge Outcomes and Lessons Learned

Key Points arising from the Challenge

The Challenge as a model for engagement and innovation

The Challenge demonstrated an effective way of engaging with external technology developers and innovators to advance environmental protection goals.

EPA was able to signal needs to the private sector, which spurred the development of new technologies that did not exist prior to Challenge.

The Challenge also demonstrated a successful, repeatable model that can be used for other technology challenges, incorporating stakeholder engagement and independent technology performance verification.

Future Direction of the Sensor

Stony Brook University is currently licensing, commercializing, and setting up manufacturing of the nitrogen sensor under the name "Verified Water".

The intent is to increase homeowner, state and local acceptance of I/A technology approvals based on sensor-enabled performance assurance.

A plan is in place to collect additional data to correlate sensor nitrate + ammonia readings to total nitrogen.



Strengthening Water Resiliency

The Challenge has helped "raise the bar" for advanced onsite technologies as an essential, environmentally-sound, permanent part of U.S. wastewater treatment infrastructure.

Sensored I/A systems have the potential to optimize/maximize pollutant reductions, enabling underserved or unsewered areas, coastal and otherwise, to have access to better performing, more sophisticated 21st century onsite wastewater treatment solutions.

Machine learning and big data approaches, incorporating multiple sensor technologies, provide an opportunity to optimize I/A performance across multiple parameters (e.g., N reduction, energy use, etc.)

For more information on the EPA Nitrogen Sensor Challenge, contact:



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Technology Profile – Stony Brook Nitrogen Sensor Completes ISO 14034 Verification

Description - Designed for in-situ, long-term deployment in residential onsite wastewater treatment systems, the Stony Brook Nitrogen Sensor is a low maintenance, self-calibrating, self-cleaning, and self-recovering (after power outages) sensor with remote data transmission capability. The sensor can continuously and simultaneously measure real-time nitrogen concentration as nitrate plus nitrite and ammonium.

Applications - The Stony Brook Nitrogen Sensor can be directly deployed with advanced septic systems, also known as Innovative/Alternate Onsite Wastewater Treatment Systems (I/A OWTSs), for real-time nitrate plus nitrite and ammonium measurement in system effluent with a range of 2 to 70 N-mg/L nitrogen (N), with a frequency of every hour, day, week, or it can be programmed to measure at specific times and dates. The sensor could be used to verify the performance of residential I/A OWTS's which would enable, better treatment of residential wastewater, better regulation of I/A OWTS's, and better management of nitrogen loading in impaired water bodies.

The Stony Brook Nitrogen Sensor could also be used to measure nitrate plus nitrite and ammonium for real-time process control at municipal wastewater treatment plants (WWTPs). Because the sensor is self-cleaning and self-calibrating, it can measure these nitrogen species accurately and reliably in real time for months at a time without taxing instrumentation maintenance staff. The sensor's relative low cost, compact design and versatility would allow for multiple units to be deployed at multiple key points in a WWTP process such as in screened primary effluent, aeration basin effluent and final effluent.

In addition, with a more sensitive version of the probe, the Stony Brook Nitrogen Sensor could be used for in-situ nitrogen monitoring in surface water when nitrogen concentration is < 2 N-mg/L.

Development of the Technology - The Stony Brook Nitrogen Sensor was developed by Dr. Qingzhi Zhu at the School of Marine and Atmospheric Sciences, and the New York State Center for Clean Water Technology at Stony Brook University in Stony Brook, N.Y. The Research Foundation for the State University of New York has a patent pending on the Stony Brook Nitrogen Sensor.

Stony Brook University describes the Stony Brook Nitrogen Sensor as Technology Readiness Level (TRL) 7 based on the sensor system being at, or near, the scale of the operational system, with most functions available for demonstration and use.

ISO 14034 Performance Verification

Performance verification of the Stony Brook Nitrogen Sensor was conducted by Battelle Memorial Institute (under contract with US EPA) in accordance with the International Organization for Standardization (ISO) standard for environmental technology verification (ETV), ISO 14034:2016, and the VerifiGlobal Performance Verification Protocol. A Verification Plan was prepared by VerifiGlobal to guide the verification process.

The performance claim verification is based on data and information provided by Stony Brook University and test results obtained through third-party testing using I/A OWTS effluent at the Massachusetts Alternative Septic System Test Center (MASSTC) and the Barnstable County Department of Health and Environment (BCDHE) laboratory.

Funding and support for independent performance testing and verification of the Stony Brook Nitrogen Sensor was provided by the U.S. EPA Office of Research and Development (ORD), Office of Water (OW) and the Office of Wastewater Management (OWM), Regions 1 and 2, and the Southeast New England Program (SNEP).

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Also see the U.S. EPA Press Release: (13 October 2021)
*Septic Nitrogen Sensor Successfully Completes
 Environmental Performance Testing*
<https://www.epa.gov/newsreleases/septic-nitrogen-sensor-successfully-completes-environmental-performance-testing>

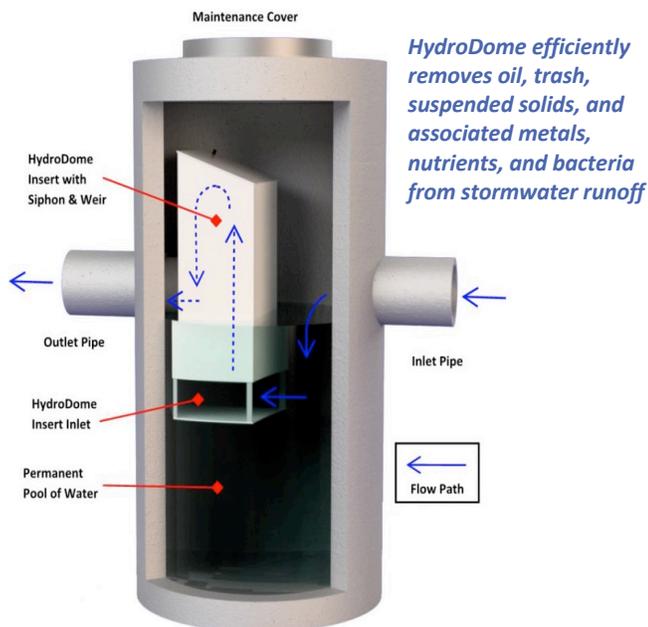


Technology Profile – Hydroworks HydroDome Completes ISO 14034 Verification

Description - HydroDome is a hydrodynamic separator that provides benefits for both water quality and water quantity (i.e., flow control). HydroDome combines the function of separator, hood, and flow control with active storage to provide a multi-purpose stormwater management solution in one structure.

HydroDome also functions as an oil separator due to the submerged inlet design that raises the water level with flow to maximize the distance between any floatables (oil, trash) and the discharge entrance to the HydroDome.

Applications - HydroDome is used as a stand-alone treatment solution for urban retrofit and redevelopment applications; as part of a treatment train for new developments; or as a pretreatment device for infiltration, underground storage, and bio-retention. HydroDome captures spills, TSS and trash. It can be used as an inlet, bend, or junction structure, and can accommodate multiple inlet pipes



ISO 14034 Performance Verification

The Hydroworks HydroDome HD3 Oil-Grit Separator (OGS) was tested by Alden Research Laboratory, Holden, Massachusetts, USA in 2021. The performance test results were verified by Fleming College's Centre for Advancement of Water and Wastewater Technologies' (CAWT) following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol.

Development of the Technology - HydroDome was developed and patented by Hydroworks, LLC.

HydroDome comes complete and slides into the outlet pipe from a drainage structure and is secured to the wall with anchor bolts. It consists of a siphon with flow control, that regulates the water level in the structure and the flow rate in the outflow, and an optional high flow weir.

The siphon raises the water level to a pre-determined level without allowing water to exit the structure. The raised water level provides:

- Greater time for initial total suspended solids (TSS) removal and for floatables to prevent re-entrainment in the flow,
- Additional dilution to reduce effluent concentrations of any pollutants, and
- A greater volume, or buffer, of water to prevent scour of previously settled solids.

Water flows into the device through horizontal openings at the bottom of the HydroDome. Water then must travel upwards through the siphon. A foam filter is located at the entrance to the siphon inlet to provide secondary protection from its clogging (the outer housing of the HydroDome and submerged inlet provide primary protection).

Once the water level reaches a pre-determined height, the siphon begins to engage, and water flows out of the structure downstream. The siphon flow is controlled by an orifice, whose size can be changed to provide the desired flow control. The water level continues to rise or begins to lower depending on the rate of flow from the orifice compared to the inflow of water to the structure.

The optional weir above the siphon provides a high flow path to prevent the system from surcharging. In cases where parking lot storage is desired, there would not be a high flow weir. A scour protection plate minimizes scour by preventing upward velocities/flow from the structure floor during periods of peak flow. Therefore, HydroDome combines the function of separator, hood, and flow control with active storage to provide a multi-purpose stormwater management solution in one structure.

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Hydroworks has been designing stormwater treatment systems since 2003 and has over 4000 systems in operation.



Clean Technology Innovation Initiative (CTII) Advancing global sustainability



Introductory CTII Workshop Report 22 September 2021

Second CTII Workshop Report 16 February 2022



Clean Technology Innovation Initiative

22 September 2021 Online Workshop Report

VerifiGlobal Newsletter
Special Edition
September 2021

Clean Technology Innovation Initiative

16 February 2022 Second Online Workshop Report

February 2022

To read the Introductory CTII Workshop Report, go to:
<https://www.verifiglobal.com/media/ax2dhwba/september-2021-newsletter-and-ctii-workshop-report-rev2.pdf>

To read the Second CTII Workshop Report go to:
<https://www.verifiglobal.com/media/kemlkfbb/second-ctii-online-workshop-report-16-february-2022-2022-02-28.pdf>

CTII focuses on the effective application of existing and proposed environmental standards to support technology innovation and the realization of global sustainability objectives. A key strategy is development of a web-based relationship map, illustrating how global sustainability goals and international standards interact and relate in a systematic way to untangle complex issues and define solution pathways that add value.



CTII Objectives

VerifiGlobal and the Standards Council of Canada launched the Clean Technology Innovation Initiative (CTII) to advance global sustainability.

Public and private organizations are challenged when considering environmental issues and new international agreements in the context of their activities and business operations. Often, they are not fully aware of the benefits and pivotal role of standards in assessing environmental performance.

With growing demand for green technologies, products and services, environmental performance standards need to be better understood and positioned to effectively support sustainable development goals. Ensuring market relevance of these products, technologies, and services requires mutual understanding and trust through meaningful engagement and the articulation of shared performance objectives, with a focus on evidence-based outcomes.

Innovative clean technologies are needed to achieve sustainability goals. We need to strengthen capacity to assess the benefits and risks of these technologies, enabling the selection and deployment of effective solutions with sustainable outcomes.

The Clean Technology Innovation Initiative (CTII) aims to improve understanding and mobilize knowledge directed at the development and deployment of innovative clean technologies and the effective use of standardization.

The CTII has two parts –

- Part 1 aims to reach consensus on the principal process elements and relationships that enable development and deployment of innovative environmentally sound solutions, and the essential linkages to existing and proposed standards.

- Part 2 involves assessment and analysis of key issues and opportunities in selected sectors where relationship mapping and performance benchmarking could be effectively applied to untangle complex issues, illustrate solution pathways, and add value.

The anticipated outcomes of the CTII include:

- Increased awareness and understanding regarding the role of standardization in supporting global sustainability, and how the ‘cross-cutting’ family of ISO TC207 standards are particularly relevant.
- A web-based relationship map, illustrating how global sustainability goals and international standards interact and relate in a systematic way.
- Effective application of existing and proposed environmental standards in support of technology innovation and the realization of global sustainability objectives.

For more information, please visit the VerifiGlobal website:

<https://www.verifiglobal.com/>



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ISO Technical Committee TC 207

ISO was created in 1947 to facilitate the international exchange of goods and services through scientific, technical and economic cooperation, and the use of standardization.

In 1993, as an outcome of the Rio Earth Summit, the ISO technical committee responsible for the 14000 series of standards (ISO TC 207) was established to help level the playing field for trade agreements and avoid protectionist barriers.

The purpose of TC 207 today is to provide frameworks for organizing and applying environmental management best practices. There are six subcommittees responsible for over 50 published standards, with 83 Member Countries, 42 Observing Members, and 32 Liaison Groups.

A driving principle is to produce standards, either alone or in collaboration with others, that support global sustainable development.

TC 207 standards include ISO 14001 and others that address environmental auditing, environmental labelling and performance evaluation, life cycle assessment and greenhouse gas measurement, adaptation, and mitigation.

TC 207 standards are adopted by many countries as national standards - particularly in the areas of environmental labelling and environmental technology verification.

In addition:

- There are over 300,000 14001 certificates recorded in ~200 countries.
- The LCA standard is used as the basis for all LCA studies (with an estimated 1500 LCA publications/year).
- GHG management standards provide an internationally agreed upon framework for measuring GHG emissions, quantifying carbon footprint, verifying claims and accreditation.

UN SDGs and TC 207 standards support 16 of the 17 UN SDGs and many of the SDG's are supported across subcommittees.

The ISO brand and its long-standing reputation is important for emerging sectors. TC 207 standards provide organizations with an effective framework to measure and improve environmental performance. However, many challenges remain, including:

- Standards proliferation
- Relevance in differing regulatory frameworks
- Time sensitivity and reaching consensus
- Developing and developed countries
- Cost effective standards and processes - especially for SMEs
- Quantification of TC 207 standards usage
- Feedback loop for improvement and emerging needs
- Coordination, collaboration, and communication.

TC 207 welcomes input as to how its standards can better meet market needs.



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Positioning innovative technologies to support sustainable development goals

ISO 14034 ETV is a quality-assured process that provides independent confirmation of the performance of environmental technologies based on objective evidence. This supports informed decision-making; and enhances the effective demonstration, deployment and market acceptance of innovative technology-based solutions.

Innovative environmental technologies provide solutions that address specific environmental challenges such as:

- Pollution prevention, control and remediation
- Efficient use of resources, including their recovery and recycling
- Climate change resilience, adaptation and mitigation
- Environmental monitoring and surveillance.

As noted earlier on page 4 of this newsletter, environmental technology verification (ETV) provides a credible, impartial account of the performance of technologies which contribute to the attainment of environmental objectives through:

- Specific, quantifiable environmental benefits (e.g., technologies with more beneficial or less adverse environmental impacts); or
- Superior measurement of environmental impacts (e.g., environmental monitoring and surveillance technologies).

The ISO 14034 ETV process is particularly effective for verifying the performance of technologies with innovative features or technical and/or environmental benefits not fully reflected in existing product standards.

Clean technology innovation requires leadership, effective engagement, and co-operation with greater emphasis on integrated approaches. Three principles help ensure that verifications are performed and reported accurately in a manner useful to stakeholders:

- Flexibility in specifying relevant performance parameters and test methods
- Credibility in generating reliable performance data using robust, quality-assured test procedures
- Transparency in assessing the evidence and verification results in reports that are clear, complete, and objective.



Although standards encompass specifications, regulations, and protocols to ensure things work properly, interactively, and responsibly, achieving global sustainability goals, such as the United Nations SDGs, requires an integrated framework to encourage mutual understanding and trust among stakeholders. Key enablers for doing this include:

1. Value-based procurement and early adoption of clean technology solutions - Benchmarking and verification provide evidence of technology performance, thereby strengthening the procurement process and making it easier to build the case for adopting innovative solutions.

2. Evidence based regulations and policies to support technology innovation - This involves the use of technology performance verification in addressing environmental regulatory requirements and approvals.

3. Transformative financing to accelerate technology deployment - Technology performance benchmarking and verification can be used to support decisions on the financing and market deployment of innovative, sustainable technology solutions.

4. Workforce training and capacity building with “living laboratory” networks to develop and demonstrate innovative technology solutions and build the essential workforce capacity to successfully deploy these technologies.

5. Effective international collaboration based on continued outreach, collaboration, and integration to accelerate market acceptance and deployment of innovative technologies.



Climate change mitigation and adaptation

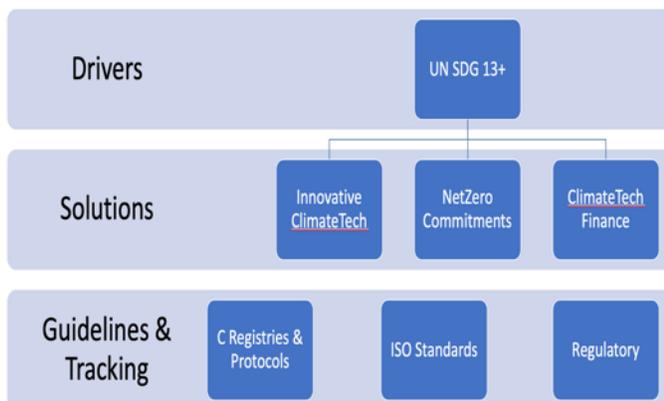
Clean technology innovation is critical to solving global environmental challenges, such as climate change. As a result of global compacts, corporate commitments, and other initiatives to address climate change, significant growth in low-carbon technology development has occurred in the past five years. We need to ensure that new technologies perform as claimed and impacts are measurable and verifiable.

Tied to this is the importance of:

- Sustainable development goals (the UN SDGs) address climate risks and impacts,
- ClimateTech innovations with the relevant standards and protocols to support them, and
- Continuous evaluation and improvement as standards/protocols rapidly evolve.

Multiple new and existing carbon offset and removal credit markets have developed to address targets and commitments:

- 23% of Fortune 500 companies have committed to carbon neutrality by 2030, and carbon negative commitments will be the next phase
- 10 gigatons/year carbon removal are needed by 2050
- All business sectors are impacted and ESG achievements becoming critical to investment & financial performance.



There are also rapidly developing standards, protocols, guidelines for carbon removal (e.g., Microsoft, Stripe, Shopify), as well as existing and changing carbon offset accounting protocols.

Global competitions (such as the \$20M NRG COSIA Carbon XPRIZE, and the \$100M Musk Carbon Removal XPRIZE) are driving tech development and markets, and hundreds of new technologies rapidly developing, gaining investment, seeking credits.

Technology and carbon offsets by themselves will not meet the need. New innovations are required to achieve all targets. As carbon becomes valued, technology impacts need to be verifiable.

When developing new technology innovations, such as CarbonTech, various standards and protocols come into play throughout the technology development lifecycle. In theory, these standards and protocols should provide useful information to stakeholders (including investors, purchasers, regulators, tech developers) about the technology through the development and deployment processes. Consensus approaches are needed to evaluate and verify impacts, performance, and credits.

Rapid growth in the CarbonTech sector causes development of new guidelines and protocols at a rapid pace, out of necessity. Stakeholders may want standards and guidelines to be implemented for a variety of reasons, which sometimes reduces consensus, leading to multiple standards or guidelines and making the CarbonTech sector more complicated. Key questions that need to be addressed are:

- Does the technology work? What are its potential impacts? Is it worth investing in?
- When implemented, how much carbon is it actually removing, or offsetting – in a real-world, large-scale project?
- Does the environmental performance meet requirements specified in its sustainability linked loan?

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Water efficiency and resilience

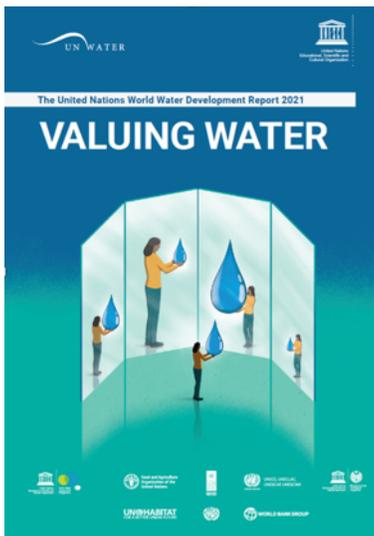
Although water is the focus of Sustainable Development Goal 6 (Clean water and sanitation for all), it is well connected to many of the other SDGs. For example, SDG goal 11 (targeted to making cities sustainable) and SDG 13 (action to combat climate change) each have a water component. Connections like these demonstrate that even though the SDGs are defined separately, overlapping themes like water resilience make the pursuit of them collaborative, and not separate and distinct from one another.

SDGs should be viewed together and addressing them will require integrated policies and collaboration. There needs to be cross-sectoral dialogue if we are going to make an impact or have measurable outcomes.

Standards are an important aspect to this, they provide benchmarks for performance and guidelines on how to achieve them, leading to manageable outcomes that are consistent across the water sector.

Addressing integrated water resources management requires engagement and collaboration. Although water efficiency and resilience may come at a higher economic cost, the significant benefits are well demonstrated

The 2021 World Water Development Report published by the UN focuses on the ways water is valued across different sectors and identifies how this valuation process can be improved. The Report notes that there are few standardized approaches to the valuation of water. Properly valuing water is a fundamental step to achieving the SDGs.



CTII - Connecting goals, solutions and reporting

This figure provides a framework for understanding the connections between high level aspirational goals (e.g., the UN SDGs) and other levels of activity (e.g., solutions implementation and reporting on progress). Within the framework, three primary relationship levels are identified: Drivers, Solutions and Tracking.





Connecting: SparkBlue - United Nations Development Programme (UNDP)

SparkBlue is the United Nations Development Programme (UNDP) digital platform for online engagement and collaboration. SparkBlue is a space to think, connect, collaborate and learn.

SparkBlue builds upon a long history of UNDP interactive consultations with development partners. These online consultations open the door for stakeholders from all sectors to participate and provide insights to the Global Development Agenda.

SparkBlue is linked to UNDP's Communities of Practice (CoPs), a distributed network of thematic experts and practitioners who collaborate to define and solve specific development challenges. Using SparkBlue, the UNDP CoPs foster collaborative engagement, activating collective intelligence, networked learning, and integrated solutions.



The **Crisis Prevention and Resilience** Cop helps countries and communities better manage conflicts, prepare for major shocks, recover in their aftermath, and integrate risk management into their development planning and investment decisions.

The **Nature Based Solutions and Climate Action** Cop aims to build the Paris Agreement and all environmental agreements into the heart of countries' development priorities.

The **Clean, Affordable Energy** Cop helps countries transition away from the use of finite fossil fuels and towards clean, renewable, affordable sources of energy.

The **SDG Integration** CoP targets systems (not just thematic sectors) to address complex challenges, including root causes and ripple effects across economies, societies and natural ecosystems.

SparkBlue is curated by UNDP's SDG Integration team.

See: <https://www.sdgintegration.undp.org/sparkblue>

Connecting: UNEP Finance Principles for Responsible Investment (PRI)

The PRI is an investor initiative in partnership with the UNEP Finance Initiative and the UN Global Compact.

PRI's primary focus is the establishment of an economically efficient, sustainable global financial system for long-term value creation.

PRI believes that such a system will reward long-term, responsible investment and benefit the environment and society as a whole.

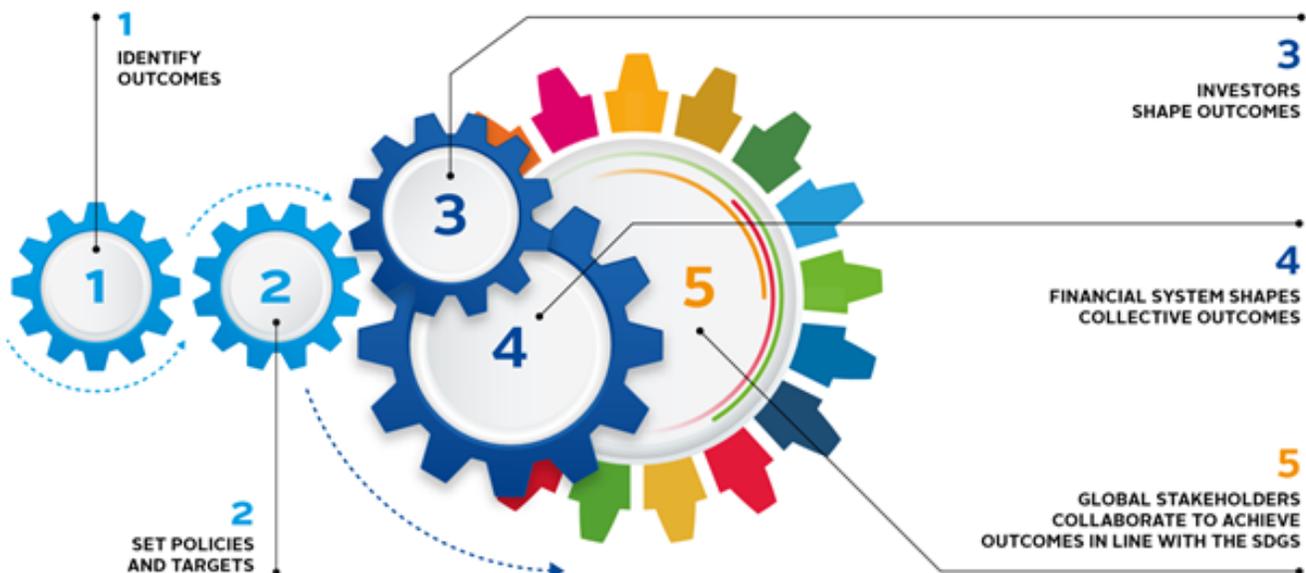
To achieve this sustainable global financial system PRI is encouraging adoption of six key principles, fostering good governance, integrity and accountability.



INVESTING WITH SDG OUTCOMES: A FIVE-PART FRAMEWORK

This 2020 report provides a high-level, five-part framework for investors looking to shape real-world outcomes in line with the Sustainable Development Goals:

- 1. IDENTIFY OUTCOMES** - Investors identifying and understanding outcomes of their investments and operations.
- 2. SET POLICIES AND TARGETS** - Moving towards intentional steps to shape outcomes.
- 3. INVESTORS SHAPE OUTCOMES** - Shaping outcomes in line with policies and targets and reporting on progress.
- 4. FINANCIAL SYSTEM SHAPES COLLECTIVE OUTCOMES** - Aggregating both individual and collective actions of investors
- 5. GLOBAL STAKEHOLDERS COLLABORATE TO ACHIEVE OUTCOMES IN LINE WITH THE SDGS** - Acting collectively, given that the SDGs will not be achieved in isolation.



See: <https://www.unpri.org/download?ac=10795>





Connecting:



The Lemelson Foundation aims to cultivate the next generation of impact inventors and strengthen the supporting systems that allow invention-based businesses to thrive. This includes providing catalytic funding to create and build vibrant invention ecosystems. The Lemelson Foundation is a primary supporter of **Engineering for One Planet (EOP)**.



The Engineering for One Planet Framework outlines the cross-cutting knowledge, awareness and competencies needed to design, build, manage and implement engineering solutions that minimize negative impacts, strive to achieve at least net neutral outcomes, and, ideally, are restorative. The intent of EOP is to

- Enable engineers to be better equipped to create positive outcomes for the planet and the life it sustains, now and for future generations, and
- Help ecosystems recover and thrive when possible.

EOP comprises the fundamental learning outcomes that every graduating engineer needs to acquire to excel as engineers operating within our planet's constraints.

By possessing the knowledge, understanding, skills, experiences, and behaviors of EOP, future engineers will be prepared with the competencies to ensure that engineering disciplines do not inadvertently harm but seek to enhance the well-being of humans and the living planet.

For more information:

<https://www.lemelson.org/building-back-for-a-healthy-planet/>

https://engineeringforoneplanet.org/wp-content/uploads/eop_engineering-for-one-planet_framework_draft.pdf



The Battelle Conference on Innovations in Climate Resilience will explore breakthroughs in technology, policy, and infrastructure to help mitigate the existential threats that climate change poses to our environment, health, communities, national security, and economic well-being. Climate resilience is focused on developing solutions to climate change. This includes innovations that reduce the impacts of climate change by restoring our ecosystems; enabling adaptation of our built infrastructure and societies; and dramatically reducing the trajectory of causative factors.

The Conference program emphasizes field applications, case studies, technology solutions and test beds, as well as research and modeling, organized around the following major themes:

- International Climate Risk Analysis and National Security
- Resilient Infrastructure: Energy, Water, Communications, Transportation and Building
- Nexus of Resilience and Ecosystem Restoration: Carbon Capture, Circular Economy, Water and Land
- Health Resilience, Risks and Interventions
- Innovations in Climate Resilient Food and Agriculture.

VerifiGlobal and 350Solutions will be presenting the Clean Technology Innovation Initiative (CTII) and an update on the CTII relationship map. Topics and questions to be addressed during the presentation include:

- What is the Clean Technology Innovation Initiative (CTII)? Why is it important to strengthen global capacity to assess, select and deploy innovative solutions with sustainable outcomes?
- Why is climate change adaptation important? Why is water resiliency important?
- What is relationship mapping? How can the CTII relationship map be used to assist in assessing and understanding clean technology solutions?
- How can innovative technologies, products, and services be better positioned to support sustainable development goals?
- How can the effective use of standardization improve understanding and mobilize knowledge directed at the development and deployment of innovative clean technologies?
- How can one become involved in the CTII and the further development and application of the CTII innovation system relationship map? What other sectors could be addressed?



INNOVATE4CLIMATE (I4C) 2022 edition takes place virtually from May 24-26.

This annual World Bank conference on climate finance, investment, and markets brings together thought leaders linking climate innovation with investment opportunities – transforming dialogue into action.

The three-day program includes plenaries, workshops, and a forum for practitioners to demonstrate how to achieve a resilient, low-carbon future.

What the World Bank is doing:

Adaptation and Resilience

- Linking adaptation and resilience to development outcomes
- Ramping up support to adapt and build climate resilience
- Leading on innovative approaches to boost adaptation and resilience outcomes.

- Ramping up climate finance and impact
- Accelerating progress on climate change with private sector investment
- Bringing benefits to vulnerable communities and supporting sustainable landscapes.

Climate Finance

Climate Action in Developing Countries

- Helping countries simultaneously address climate change and development challenges
- Helping deliver on the goals of the Paris Agreement
- Addressing climate challenges upstream.

VerifiGlobal plans to participate





VerifiGlobal Course on Environmental Technology Verification

In 2017, VerifiGlobal developed a short course on ISO 14304 Environmental Technology Verification (ETV), which can be presented at a range of different venues.

Objective of the short course: To present the ISO 14034 standard, including principles, procedures, and benefits of environmental technology verification (ETV) and how this can facilitate market acceptance and regulatory approval of innovative technologies.

Benefits of ISO 14034 ETV: Published in 2016, the ISO 14034 ETV standard provides a specified framework for the evaluation of environmental technologies. The process outlined in the standard provides legitimacy to third-party verification of environmental technology performance claims. Use of the standard offers the following benefits:

- **Robust verification:** A functional quality-assured process for technology performance verification, supported by effective testing and verification protocols;
- **Reciprocity and acceptance:** Effective engagement of stakeholders and other interested parties when identifying relevant performance parameters, with greater potential for reciprocity and acceptance of test methods, performance data and verification results across multiple jurisdictions;
- **Market adoption:** Accelerated market adoption of verified technologies by a broader range of users across different sectors, particularly when considering proposed solutions and potential outcomes that involve trade-offs and risks.

For the 'clean-tech' industry and environmental technology companies, independent verification based on the ISO 14034 ETV standard provides credible evidence that technologies perform as claimed, which helps convince potential clients, as well as regulators, of the legitimacy and value of these verified technologies.

For industries and governments that require technologies to prevent, control and remediate pollution, and/or improve environmental performance, independent verification based on the ISO 14034 ETV standard provides credible performance information, which informs choices and helps justify decisions.

Specific examples are provided in the short course to illustrate how ISO 14034 is being applied.

The targeted audience includes technology developers, vendors, solution providers and clean-tech investors, as well as technology buyers, users, managers, regulators, and agencies.

*For more information on the short course or to explore options for presentation at a particular venue, contact VerifiGlobal:
<https://www.verifiglobal.com/en>*





Why VerifiGlobal and the VerifiGlobal Alliance?

Creating value through informed decisions and sustainable results



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